Name ______________________ Student Number ______________

All solutions are to be presented on the paper in the space provided. The quiz is open book. You can discuss the problem with others and ask the TA questions.

(1) Find the domain of the following functions:

(a) $f(x) = \dfrac{x}{e^{x^2} - e^x}$

$$\begin{aligned} e^{x^2} - e^x &= 0 \\ x^2 - x &= 0 \\ x(x-1) &= 0 \\ x &= 0, 1 \end{aligned}$$

So, $D_f = (-\infty, 0) \cup (0, 1) \cup (1, \infty)$.

(b) $f(x) = \log_2 \left(\dfrac{x-1}{x+1} \right)$

$$\frac{x-1}{x+1} > 0.$$

Use a sign table:

	$x < -1$	$-1 < x < 1$	$x > 1$
$x-1$	$-$	$-$	$+$
$x+1$	$-$	$+$	$+$
$\dfrac{x-1}{x+1}$	$+$	$-$	$+$

So, $D_f = (-\infty, -1) \cup (1, \infty)$.

(2) Solve the following equations:

(a) $e^{x^2+x-2} = 1$

$$\begin{aligned} x^2 + x - 2 &= 0 \\ (x+2)(x-1) &= 0 \\ x &= -2, 1 \end{aligned}$$

Over→

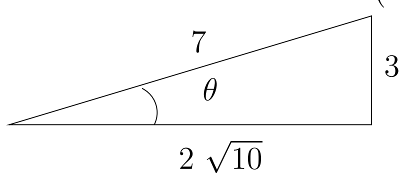
(b) $\ln(x^2-1)=e^2$

$$\begin{aligned} x^2-1 &= e^{e^2} \\ x^2 &= e^{e^2}+1 \\ x &= \pm(e^{e^2}+1) \end{aligned}$$

(3) Find the inverse of $f(x)=\ln(e^x+1)$

$$\begin{aligned} y &= \ln(e^x+1) \\ e^y &= e^x+1 \\ e^x &= e^y-1 \\ x &= \ln(e^y-1) \\ f^{-1}(x) &= \ln(e^x-1) \end{aligned}$$

(4) Find the exact value of $\sec(\sin^{-1}(\frac{3}{7}))$



From the above picture, we see that

$$\sec\theta = \sec\left(\sin^{-1}\left(\frac{3}{7}\right)\right) = \frac{7}{2\sqrt{10}}$$